

The Summer Undergraduate Research Fellowship (SURF) Symposium
3 August 2017
Purdue University, West Lafayette, Indiana, USA

Operation of the T-100 Hall Effect Thruster

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ABSTRACT

The introduction of Hall Effect Thrusters from the former Soviet Union to the United States generated considerable interest in using the propulsion system aboard Western spacecraft. The established programs evaluated the SPT-100, and TAL-55 Hall Effect Thrusters for efficiency, lifetime, and performance characteristics. The T-100 model garnered only minor interest during this time compared with the same generation counterparts, the SPT-100, and TAL-55. This gap in knowledge on the efficiency, and performance of the T-100 warrants investigation into the design, and operation of the thruster. Operational characteristics will be measured on a restored T-100 Hall Thruster, using argon as a propellant. The efficiency of the Hall Thruster operation is affected by the utilization of the propellant mass, and power inputs. Power inputs of the magnetic arrays for the T-100 are less than optimal due to the inherent losses in the magnetic architecture. The ignition system of the hollow cathode improves cathode mass flow efficiency by eliminating pre-heating. The T-100 Hall Effect Thruster provides a robust option for modern electric propulsion systems that is comparable to its counterparts.

KEYWORDS

Electric Propulsion, Hall Effect, Thruster, T-100